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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/665,818	09/20/2000	Chien-Ping Huang	U 013803-1	8042

7590 05/29/2003
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EXAMINER

FARAHANI, DANA

ART UNIT PAPER NUMBER

2814

DATE MAILED: 05/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/665,818

Applicant(s)

HUANG, CHIEN-PING

Examiner

Dana Farahani

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3, 4, 6, 7, 10, 11, 13-15, 17, 18 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Kinsman et al., hereinafter Kinsman (U.S. 6,159,764).

Regarding claims 1, 6, 7, 13-15, 18 and 20, Kinsman discloses in figure 1C a semiconductor package comprising a die 74 having an active surface; a lead frame 78, including a plurality of leads 76 electrically connected to the active surface of the die, the leads having a surface; an encapsulant, not numbered, sealing the die and at least a portion of the surface of the leads in the lead frame; a heat sink 88 attached to the second surface of the die and at least a portion of the surface of leads in the plurality of leads with a thermally conductive and electrically insulating glue 82; and the heat sink is exposed to the environment at the bottom part, as can be seen in the figure.

Regarding claims 3, 10, and 17, see column 5, line 27.

Regarding claims 4 and 11, see figure 1A.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 8, 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinsman, as applied to claims 1 and 6 above, and further in view of Yamaguchi (U.S. Patent 6,081,029).

Regarding claim 8, Kinsman discloses the limitations in those claims, as discussed above, in figure 1C, except for a hole in a die pad for the glue and the heat sink to stick with it.

Yamaguchi discloses that a die pad provided with a hole will be hold more strongly in place with a resin type material, which would be in the hole (see column 3, lines 42-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a hole in the die pad of Kinsman so the glue with the heat sink and the die pad would be attached more strongly together.

Regarding claims 2, 9, and 16, Kinsman in view of Yamaguchi renders obvious the claimed invention, as discussed above, except for expressly disclosing the heat sink is made of material selected from the group consisting of copper, copper alloy, aluminum or aluminum alloy. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use one of these materials as the heat sink, since it is well known in the art that these materials are commonly used as heat sinks.

5. Claims 5, 12, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinsman in view of Yamaguchi as applied to claim 4 above, and further in view of Yamashita (U.S. 5,789,820).

Kinsman in view of Yamaguchi discloses the limitations in claim 4 and 5 except for a heat radiator on top of the heat sink. Yamashita discloses in figure 6 a heat radiator 17 on top of heat sink 12. therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the heat radiator in conjunction with the heat sink in order to enhance heat radiation from the heat sink.

Response to Arguments

6. Applicant's arguments filed 4/14/03 have been fully considered but they are not persuasive.

Applicant argues that the entire heat sink of the instant application is exposed to the ambient environment, while in the primary reference cited, the heat sink is completely inside the encapsulant. Applicant makes reference to a portion of the heat sink 88 of the Kinsman reference in which merely a portion of the heat sink is not encapsulated, while in the instant claimed invention the heat sink in its entirety is not encapsulated. While this is true, the examiner notes that the claims merely recite "said heat sink being exposed to ambient atmosphere and not encapsulated in said encapsulant". Claim 1 makes no indication that the entire structure of the heat sink is exposed to the environment, and therefore, the reference, in which only a small portion of the heat sink is exposed, reads on the claim.

In regards to applicant's argument that Tarashima discloses a semiconductor device with a PBGA structure similar to the claimed invention, with respect to the pad being part of the lead frame in the claimed invention, while it is separate from the lead frame in the Terashima reference, this reference is deleted from the rejection, since the primary reference, Kinsman, has a die pad (in the central portion of the lead structure shown) which is part of the lead structure.

In regards to applicant's argument that the holes in Yamaguchi, which are relied on in the rejections above, has a completely different function than the holes in the instant application, note that the structure of the reference is used to address the limitation in the claims, and because the structure serves a different purpose than that of the claims does not make the rejection improper.

Conclusion

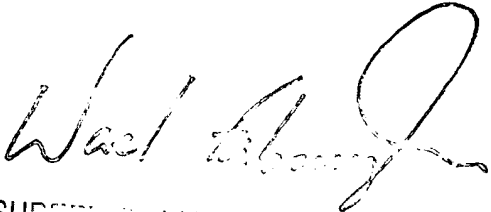
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703)308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani
May 27, 2003


SUPERVISOR PRIMARY EXAMINER
TECHNOLOGY CENTER 2600
